19. The fuel additive composition of claim 1 wherein the liquid hydrocarbon fuel is gasoline.

REMARKS

The above amendments are made to correct clerical errors to meet the objections and rejections set forth by the Examiner. The specification is amended at page 4 as requested. Claim 19 is added and better differentiates the teaching of the Grangette patent.

Claims 9-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "types" which appears in claim 9, line 4 and in claim 14, line 6 is asserted to be indefinite. The word "types" has been deleted to render the claims definite.

Claims 1-8 are rejected under 35 U.S.C. 103 as being unpatentable over the patents of Grangette, McCoy and Wenzel. The Grangette patent is admitted prior art and is distinguishable from the applicant's invention. Grangette does teach a stable water and surfactant emulsion. Although Grangette speaks of an emulsion for gas oil, he is speaking of diesel and not gasoline. Also by stable, Grangette is speaking stable when added to diesel, and not when added to gasoline. Although the ratio ranges approach each other and they teach moving in opposite directions. Grangette teaches having more water in the emulsion and Applicant teaches having less water. The key is applicant's appreciation of the effect of the residual water found in gasoline and its effect on stability of an emulsion additive and on producing a positive effect. Similarly when adding an emulsion to diesel the ratio is critical to having a stability of sufficient duration to effect a

beneficial success. Commercial success is a measure of the effectiveness. The Grangette emulsions have not developed a market. Applicant in an enclosed declaration gives evidence in support of the above differences being significant and also includes additional test work in favor of lowering the water ratio in the emulsion. Applicant believes water is essential to forming a stable emulsion for storage and transport and which will properly disperse even in fuels having some water therein. The ratios have an importance that the prior art did not appreciate.

Grangette's inventors are French and their reference to "gas oil" is to what Americans refer to as automotive diesel fuel. This distinction is made in the fifth and sixth paragraphs of the Grangette description. One concludes therefore that Grangette's mixtures do not work with gasoline. The additive of our invention works with both diesel fuel and with gasoline.

The examiner is correct in stating that if the water comprises 10 to 65% by weight of our additive (and if the co-surfactant is absent) then presumably the surfactant(s) must therefore comprise the balance of 90 to 35% by weight of the additive. However, we also stipulate the required ratio between the weights of the surfactant(s) and the water (something that Grangette failed to realize was of any significance once the added water content approaches that of the dissolved water content).

Grangette discloses an added water content range from 100 ppm to 5,000 ppm. However, Grangette actually teaches away from the 100 ppm water content (column 6, line 10) by stating that 1,000 ppm of water gives the optimum overall improvement. We suspect that this is because the performance of his emulsion fuel with 100 ppm added water was probably erratic due to instability problems caused by dissolved water already present in the fuel.

Grangette gives only two examples using 100 ppm water (#2 and #17). It appears that both of these examples have an insufficient surfactant to water ratio of only 1:4 (instead of 2:1) and therefore probably were unstable over time (and hence not commercially practical). Grangette thus fails to appreciate the significance of the 75 ppm background dissolved water level (as well as how to address the problem) and hence failed to investigate themselves nor suggest to others to investigate the huge potential of ultra low water content emulsion fuels (i.e. those with less than 100 ppm water).

Compare Grangette examples #2 and #3 with regard to the critical surfactant to water ratio. In column 3, paragraph 7, Grangette admits that this ratio is important when he states "the quantity of the surfactant utilized is proportional to the quantity of water to be solubilized." Grangette examples #2 and #3 result in the following surfactant to water ratios when the 75 ppm background level of dissolved water **is not included** :-

	Example #2	Example #3
Water (ppm)	100	1,000
Co-surfactant (ppm)	25	500
Surfactant (ppm)	25	500
Surfactant to Water Ratio	1:4	1:2

Now compare the surfactant to water ratios for the same two examples (#2 and #3) when the 75 ppm background level of dissolved water **is included** :-

	Example #2	Example #3
Water (ppm)	175 (100+75)	1,075 (1,000+75)
Co-surfactant (ppm)	25	500
Surfactant (ppm)	25	500

Surfactant to Water Ratio 1:7 1:2.15

As can be clearly seen, the 75 ppm dissolved water has a negligible effect in example #3 (1,000 ppm water), where the surfactant to water ratio increases from 1:2 up to 1:2.15 (only a 7½% increase). However, this dissolved water has a disproportionate effect in example #2 (100 ppm water) where it increases the surfactant to water ratio from 1:4 up to 1:7 (a 75% increase) causing almost certain fuel emulsion instability.

Although the added water content of the emulsion fuels of the Applicant and Grangette actually approach each other (at about 100 ppm) each teach improvements with water content moving in opposite directions. Applicants teach that less water is better in the fuel emulsion, whilst Grangette teaches that more water is better.

The unusual, surprising and unexpected result when using ultra low water content fuel emulsions (95 ppm or less water) is the significant improvement in vehicle fuel economy which can happen (typically 8%), thereby allowing the invention to be employed in a cost effective manner not previously realized.

The present invention also solves an unrecognized problem associated with ultra low water content fuel emulsions. Without extra surfactants, any ultra low water content fuel emulsion (typically 40 ppm added water) would slowly be overwhelmed by the background level of dissolved water always present in all commercial fuels (typically 50-100 ppm). By employing an unusually high surfactant to water ratio (typically 2: 1) we achieve the long term fuel emulsion stability necessary for commercial success.

Commercial success is one indicator of unobviousness. The additives in accordance with our invention are sold in several countries to individuals with various driving habits and as additives to both gasoline and diesel fuel. There are few complaints and none indicating that the mixtures become unstable and cause mechanical problems. These ultra low water content emulsion fuels/additives have already achieved a significant level of commercial success. An additive in accordance with the invention is

currently the #1 selling aftermarket fuel additive in Japan. There are also sales in China, Thailand, Singapore and Malaysia. During the last three years, the overseas sales for additives using this technology are well over $3 million.

As further evidence, the results from two more tests show fuel economy benefits can improve substantially as the added water content of the emulsion fuel falls below 100 ppm. These examples are set forth in the Hicks declaration. An additional 21 ppm water is over three times more effective at improving fuel economy than was 42 ppm additional water. Less water can be more effective.

Applicant respectfully requests that the Claims as amended be passed to allowance.

Respectfully submitted,

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